



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,282	07/08/2003	William E. MOERNER	12665.0029.NPUS01	1281

23369 7590 04/04/2005

HOWREY SIMON ARNOLD & WHITE LLP  
c/o IP DOCKETING DEPARTMENT  
2941 FAIRVIEW PARK DRIVE, SUITE 200  
FALLS CHURCH, VA 22042-7195

EXAMINER

HAQ, SHAFIQUH

ART UNIT	PAPER NUMBER
----------	--------------

1641

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

12

<b>Office Action Summary</b>	<b>Application No.</b> 10/604,282	<b>Applicant(s)</b> MOERNER ET AL.	
	<b>Examiner</b> Shafiqul Haq	<b>Art Unit</b> 1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3-5, 8, 10 and 12-13 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 6, 7, 9, 11 and 14-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/29/03</u> . | 6) <input type="checkbox"/> Other: ____  |

*SH*

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Although specific claims may be discussed in the rejections below, these rejections are also applicable to all other claims in which the noted problems/language occur.
2. Claims 16, 29 and 38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 1 requires D to be a donor group having at least one free electron (eg. nitrogen, oxygen) but claim 16 recites that D comprises functional group. It is not clear whether functional group is a substitution on D or the function group replaces D. If the latter is the case, then how does this compound function where

it requires an electron donor at this position? It is not clear that a compound having a functional group on the D moiety would be fluorescent since the functional group might interfere with the electron transfer through the "multiple bond conjugated with the donor group".

3. Claims 14-16, 18-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(a) Claims 14-16, 27-29 and 36-38 are indefinite as it is not clear about the position or point of attachment of functional group in the compounds of claim 1.

(b) Claim 16 and 29 recites the limitation "the functional group" in line 3. There is insufficient antecedent basis for this limitation in the claim. Note that claim 14 recites "at least one functional group" (includes more than one), while claim 16 recites "the functional group" (only one group).

(c) With respect to claim 18 and 32, the word "under conditions suitable" renders the claims indefinite because the claims include elements not clearly pointed out, thereby rendering the scope of the claim unascertainable. The final structure of the conjugate including the type of binding between the fluorophore and biomolecule is unclear.

(d) With respect to claims 18-40, it is not clear where (point of attachment) the biomolecules are bonded to the fluorophore compounds nor is it clear

exactly what bond is formed between the fluorophore and the "biomolecule" or "biological structure".

- (e) Claim 30 and 39 provide for the method of detecting biomolecule, but, since the claims does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 1,2,6-7,9,11 and 17 are rejected under 35 U.S.C. 102(a) as being anticipated by Hou et al. (Hou et al. Applied Physics Letters 2003, Vol. 82, No.20, pages 3385-3387).

Applicant claims fluorophore compounds and their use in biological system. Hou et al. discloses a compound (See Fig.1 and Table1) which anticipates the instantly claimed invention wherein R1-R4 =alkyl, A = aromatic, styrene or vinyl, D(donor group)=nitrogen. As for claim 17, Hou et al describe the instantly claimed compound DCDHF-2EH-V (see Fig.7 (23) in the specification),

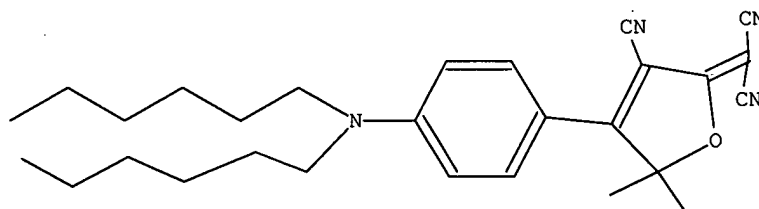
**Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1,2,6-7,11 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gubler et al. (Gubler et al. Adv. Mater. 2002, 14, No.4, pages 313-317).

Gubler discloses DCDHF-6 chromophore (page 314, Fig.1 and page 316, scheme 1) :



DCDHF-6 is a structural homolog of DCDHF-3, DCDHF-4, DCDHF-5, DCDHF-8 and they are expected to function similarly. DCDHF-6 differs in structure from the above compounds only by chain length of the alkyl groups attached to the donor nitrogen (e.g. in DCDHF 5, C=5; in DCDHF-6, C=6; in DCDHF-8, C=8) and thus are expected to provide equivalent function. Applicant claims DCDHF-3, DCDHF-4, DCDHF-5, DCDHF-8 besides other structures and if alkyl with shorter or longer carbon chain length attached to nitrogen can be

Art Unit: 1641

used, then DCDHF-6 with alkyl carbon chain length in between DCDHF-5 and DCDHF-8 would be expected to provide equivalent function.

Therefore, Given this fact above, it would have been obvious at the time of the invention to a person of ordinary skill in the art to expect DCDHF-6 to function equivalently and thus the claims are unpatentable over Gubler.

6. Claims 14-16 and 18-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gubler and further in view of Mayer (Mayer et. al. Angen. Chem. Int. Ed. Engl. 1994) and Davis (US Patent #6133429).

Gubler discloses fluoropore compound as discussed above but fails to disclose conjugation of the compound to biomolecules.

Mayer in a review article discloses luminescent labels (chromophores) with reactive functional groups that can be conjugated with various biomolecules (Page 1046, scheme 1 and section 2.2.4, lines 1-15). Mayer also discloses different fluorescence methods (e.g fluorescence polarization) (pages 1052-1053) for the detection of fluorescence.

Mayer did not mention about labeling nucleic acid and cells. Davis et al. in a method of preparation of chromophore conjugates disclose labeling biomolecules including nucleic acids and cells with chromophore (column 1, lines 1-4 and claims 1-5 and 33-53).

Since conjugation (labeling) of biomolecules to chromophores /fluorophores are common and known in the art and once a suitable fluorophore

Art Unit: 1641

compound is found, one would obviously consider to label the compound with a biomolecule for detection and for bioassays.

Therefore, given the fact that conjugation of fluorophores to biomolecules are common in the art, it would have been obvious at the time of the invention to a person of ordinary skill in the art to label biomolecules as taught by Mayer and Davis to fluorophore DCDHF-6 or its equivalent fluorophores (e.g. DCDHF-5, DCDHD-8) to be useful in biological system.

7. Claims 14-16 and 18-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hou et al (see paragraph 4 above) and further in view of Mayer (Mayer et. al. Angen. Chem. Int. Ed. Engl. 1994) and Davis (US Patent #6133429).

Hou et al discloses fluorophore compound (DCDHF-2EH-V) as discussed above but fails to disclose conjugation of the compound to biomolecules.

Mayer in a review article discloses luminescent labels (chromophores) with reactive functional groups that can be conjugated with various biomolecules (Page 1046, scheme 1 and section 2.2.4, lines 1-15). Mayer also discloses different fluorescence methods (e.g fluorescence polarization) (pages 1052-1053) for the detection of fluorescence.

Mayer did not mention about labeling nucleic acid and cells. Davis et al. in a method of preparation of chromophore conjugates disclose labeling



Art Unit: 1641

biomolecules including nucleic acids and cells with chromophore (column 1, lines 1-4 and claims 1-5 and 33-53).

Since conjugation (labeling) of biomolecules to chromophores /fluorophores are common and known in the art and once a suitable fluorophore compound is found, one would obviously consider to label the compound with a biomolecule for detection and for bioassays.

Therefore, given the fact that conjugation of fluorophores to biomolecules are common in the art, it would have been obvious at the time of the invention to a person of ordinary skill in the art to label biomolecules as taught by Mayer and Davis to fluorophore DCDHF-2EH-V or its equivalent fluorophores (e.g. DCDHF-5, DCDHD-8) to be useful in biological system.

***Allowable Subject Matter***

8. Claims 3-5,8,10 and 12-13 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim 1 and any intervening claims.
9. The closest prior arts disclose fluorophore compounds of the instant claim 1 wherein D is nitrogen but they fail to disclose compounds where donor group "D" comprises oxygen atom, sulfur atom or phosphorous atom conjugated with A as claimed in claims 3-5. Furthermore, there is no disclosure in the prior art for the composition of claim 1 wherein A comprises thiophene, furan, pyrrole, imidazole,

Art Unit: 1641

pyrazole, oxazole, thiazole, diazole, oxadiazole, thiadiazole or tolane group as claimed in claims 8 and 10. Prior art also fail to disclose  $R_1$  to  $R_4$  wherein  $R_1$ - $R_2$  is alkoxy alkyl and  $R_3$ - $R_4$  is fluoroalkyl as calimed in claims 12-13.

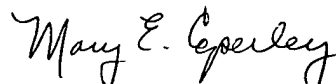
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shafiqul Haq whose telephone number is 571-272-6103. The examiner can normally be reached on 7:30AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long V. Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



SHAFIQUL HAQ  
EXAMINER  
ART UNIT 1641



MARY E. CEPERLEY  
PRIMARY EXAMINER  
ART UNIT 1641

SH